

UNITED STATES PATENT OFFICE

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METHOD OF MAKING LIGHT WEIGHT
REFRACTORY BRICK

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3 Claims. (Cl. 25—156)

This invention relates to improvements in light-weight refractory insulating brick or the like, of the type in which the porosity is obtained by the admixture of combustible materials in the clay before shaping and firing; materials suitable for the purpose and which have been in common use being sawdust, cork, corn cobs, peanut hulls, straw and various other organic materials; also coke breeze and coal have been used for this purpose.

In accordance with the present invention, it has been found that the addition of paper in shredded or comminuted form is very beneficial to the texture and strength of the finished product due to its knitting together with the various ingredients in the tempered batch.

The use of such shredded or comminuted paper is also very beneficial in drying because of the capillary action set up throughout the fibers of the material. This results in low loss in burn-out material during the drying period, which is directly attributable to the uniformity of drying. The paper fibers themselves also add great strength in the dry or drying state, and there is substantially no loss in drying due to cracks or breaking in handling, which is common when materials of a non-fibrous nature are used.

It is also found that the firing or burning of the bricks is materially aided by the use of shredded or comminuted paper because the ignition of the finely divided paper fibers begins at a much lower temperature, approximately 400° F., which is considerably below that of ordinary burn-out materials. The finely divided fibers burn-out at this stage, opening the channels for the escape of the gases from the heavier or coarser particles of burn-out materials which ignite later, thus preventing disruption of the clay body. The use of shredded or comminuted paper further results in a product of greater strength, as the employment of paper allows for the use of much larger quantities of water in the tempered batch, yet allowing the tempered batch to be molded satisfactorily. Since the water is the vehicle for the movement of the clay in the batch, additional water aids in bringing the clay in extremely intimate contact with the fibers and other combustibles. The subsequent tempering of the batch in a wet pan or other tempering or mixing machinery produces a knurly and fibrous-like structure, which is unattainable by the use of the more granular type burn-out materials, and because of this knurly structure, greater strength results in the finished product.

Actual tests have demonstrated that paper is beneficial to burn-out brick in amounts ranging from five to fifty percent of the total batch when combined with peanut hulls, sawdust, round corn cobs, etc.

In an insulating brick suitable for service at 1600° F., 20% to 25% shredded or comminuted paper is found to be the most desirable; in an insulating brick suitable for service at 2000° F., 25% to 30% gives the best results; and in an insulating brick suitable for service at 2600° F., 20% to 25% seems to give the best results.

The resultant product possesses higher insulating value than brick made only with the more granular materials because the paper materials produce an excessive amount of fine cells. Heat travels in a wave motion and will penetrate into a new medium when it strikes a flat surface, but when it strikes at an angle it is reflected; hence the excessive porosity of the paper fired brick produces a higher insulating value, there being a minimum of flat surfaces.

While the invention has been described as for use in light-weight insulating brick, it is obviously adapted for any fired clay product in which light-weight or insulating value or high porosity is desired.

I claim:

1. The method of making light-weight refractory insulating brick, which comprises mixing the batch material of clay with 1% to 50% shredded or comminuted paper, tempering the batch in a wet state to produce a knurly and fibrous structure, molding the batch to the desired shape, and subjecting it to a firing temperature in a kiln to burn-out the paper.

2. The method of making light-weight refractory insulating brick, which comprises mixing the batch material of clay with 20% to 25% shredded or comminuted paper, tempering the batch in a wet state to produce a knurly and fibrous structure, molding the batch to the desired shape, and subjecting it to a firing temperature in a kiln to burn-out the paper.

3. The method of making light-weight refractory insulating brick, which comprises mixing the batch material of clay with 25% to 30% shredded or comminuted paper, tempering the batch in a wet state to produce a knurly and fibrous structure, molding the batch to the desired shape, and subjecting it to a firing temperature in a kiln to burn-out the paper.

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